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grouping said digital data into a number of data segments by a

forming said [b] in which the] first commutative checksum [(KP1) is  
] by a commutative operation [( $\oplus$ ) on said [the] first segment

cryptographically protecting said (c) in which the] first commutative  
um [(KP1) is cryptographically protected] by using a [at least one]

grouping digital data into a number of data segments by a computer.

subjecting said [a) in which the] cryptographic commutative checksum

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cont

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forming [b) in which] a second segment checksum [(PS<sub>j</sub>) is formed] for each said data segment [(D<sub>j</sub>, j = a .. z)],

checking said [d) in which the] second commutative checksum [(KP2) is checked] for a match with said [the] first commutative checksum [(KP1)].

3. (Amended) A method [Method] for forming and checking a first commutative checksum [(KP1)] for digital data comprising the steps of: [which are grouped into a number of data segments ( $D_i$ ,  $i = 1 \dots n$ ), by a computer,]

grouping said digital data into a number of data segments by a computer.

forming [a] in which] a first segment checksum [(PSi is formed] for each said data segment [(Di)],

forming said [b]in which the] first commutative checksum [(KP1) is formed] by a commutative operation [( $\oplus$ )] on said first [the] segment checksums [(PSi)],

~~cryptographically protecting said [c) in which the] first commutative checksum [(KP1) is cryptographically protected] by using at least one cryptographic operation, which forms a cryptographic commutative checksum [being formed],~~

~~subjecting said~~ [d] in which the] cryptographic commutative checksum [(KP1) is subjected] to an inverse cryptographic operation to form a reconstructed first [reconstructed] cryptographic checksum [(KP1)],

forming (e) in which] a second segment checksum [(PS<sub>j</sub>) is formed] for

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each said data segment  $[(D_j, j = a \dots z)]$  of said [the] digital data to which said [the] first commutative checksum  $[(KP1)]$  is allocated,

5 forming [f] in which] a second commutative checksum  $[(KP2)]$  is formed] by a commutative operation  $[(\oplus)]$  on said [the] second segment checksums  $[(PS_j)]$ , and

checking said [g] in which the] second commutative checksum  $[(KP2)]$  is checked] for a match with said [the] reconstructed first [reconstructed] commutative checksum  $[(KP1)]$ .

10 therefor.

Cancel claim 4 and substitute the following claims <sup>19 20 21</sup> 21, 22, and 23

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15 <sup>19</sup> 21. A method according to claim 1, further comprising the step of:  
forming said first segment checksums in accordance with a type selected from the group consisting of a hashing value, a CRC code, and a cryptographic one-way function.

<sup>20</sup> 22. A method according to claim 2, further comprising the step of:  
forming said second segment checksums in accordance with a type selected from the group consisting of a hashing value, a CRC code, and a cryptographic one-way function.

20 <sup>21</sup> 23. A method according to claim 3, further comprising the step of:  
forming said first segment checksums and said second segment checksums in accordance with a type selected from the group consisting of a hashing value, a CRC code, and a cryptographic one-way function.

24 Cancel claims 5 and 6, and substitute the following claims <sup>22 23</sup> 24, 25, and <sup>24</sup> 26 therefor.

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<sup>22</sup>  
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A method according to claim 1, wherein:  
said cryptographic operation is an operation selected from the group  
consisting of a symmetric cryptographic method and an asymmetric  
cryptographic method.

<sup>23</sup>

25.

A method according to claim 2, wherein:  
said cryptographic operation is an operation selected from the group  
consisting of a symmetric cryptographic method and an asymmetric  
cryptographic method.

<sup>24</sup>

26.

A method according to claim 3, wherein:  
said cryptographic operation is an operation selected from the group  
consisting of a symmetric cryptographic method and an asymmetric  
cryptographic method.

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Cancel claim 7 and substitute the following claims <sup>25 26 27</sup> 27, 28, and <sup>27</sup> 29 therefor.

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<sup>25</sup> 27.

A method according to claim 1, wherein:  
said commutative operation exhibits the property of associativity.

<sup>26</sup>

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A method according to claim 2, wherein:  
said commutative operation exhibits the property of associativity.

<sup>27</sup>

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A method according to claim 3, wherein:  
said commutative operation exhibits the property of associativity.

Cancel claim 8 and substitute the following claims <sup>28 29 30</sup> ~~30~~, ~~31~~, and ~~32~~ therefor.

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<sup>28</sup>  
~~30~~.

A method according to claim 1, further comprising the step of: protecting said digital data wherein said data segments have no ties to a specific ordering.

<sup>29</sup>  
~~31~~.

A method according to claim 2, further comprising the step of: protecting said digital data wherein said data segments have no ties to a specific ordering.

<sup>30</sup>  
~~32~~.

A method according to claim 3, further comprising the step of: protecting said digital data wherein said data segments have no ties to a specific ordering.

Cancel claim 9 and substitute the following claims <sup>31 32 33</sup> ~~33~~, ~~34~~, and ~~35~~ therefor.

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<sup>31</sup>  
~~33~~.

A method according to claim 1, further comprising the steps of: protecting said digital data, and processing said digital data in accordance with a network management protocol.

<sup>32</sup>  
~~34~~.

A method according to claim 2, further comprising the steps of: protecting said digital data, and processing said digital data in accordance with a network management protocol.

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35. A method according to claim 3, further comprising the steps of:  
protecting said digital data, and  
processing said digital data in accordance with a network management  
protocol

5 Amend the following claims 10 through 12.

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10. (Amended) An arrangement [Arrangement] for forming a  
first commutative checksum [(KP1)] for digital data which are grouped into a  
number of data segments [(Di, i = 1 .. n)], said arrangement comprising:  
[by means of] an arithmetic and logic unit, [which is arranged in such a  
manner that]

[a]) a first segment checksum, which [(PSi)] is formed for each said  
data segment [(Di)],

[b] the first commutative checksum (KP1) is formed by] a commutative  
operation [(⊕)] which forms said first commutative checksum by operating on  
said [the] segment checksums [(Psi)], and

[c] the first commutative checksum (KP1) is cryptographically  
protected by using at least one] a cryptographic operation which  
cryptographically protects said first commutative checksum.

11. (Amended) An arrangement [Arrangement] for checking a  
predetermined first commutative checksum which is allocated to digital data  
which are grouped into a number of data segments, said arrangement  
comprising:

[by means of] an arithmetic and logic unit, [which is arranged in such a  
manner that]

[a] the cryptographic commutative checksum is subjected to] an inverse  
cryptographic operation to form a first cryptographic checksum [(KP1)] from a

cryptographic commutative checksum formed by a cryptographic operation,

[b)] a second segment checksum [(Psj)] which is formed for each said data segment [(Dj, j = a .. z)],

[c) a second commutative checksum (KP2) is formed by] a commutative operation [(⊕)] which operates on said [the] second segment checksums [(PSj)] which forms a second commutative checksum, and

[d)] a comparator which checks for a match between said [the] second commutative checksum [(KP2) is checked for a match with the] and said first commutative checksum [(KP1)].

12. (Amended) An arrangement [Arrangement] for forming and checking a first commutative checksum [(KP1)] for digital data which is grouped into a number of data segments [(Di, i = 1 .. n)], said arrangement comprising:

[by means of] an arithmetic and logic unit, [which is arranged in such a manner that]

[a)] a first segment checksum, which [(PSi)] is formed for each said data segment [(Di)],

[b) the first commutative checksum (KP1) is formed by] a commutative operation [(⊕)] which forms said first commutative checksum by operating on said first [the] segment checksums [(Psi)],

[c) the first commutative checksum (KP1) is cryptographically protected by using at least one] a cryptographic operation which cryptographically protects said first commutative checksum, [a cryptographic commutative checksum being formed,]

a cryptographic commutative checksum formed by said cryptographic operation.

[d) the cryptographic commutative checksum is subjected to] an inverse cryptographic operation to form a first cryptographic checksum [(KP1)] from

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said cryptographic commutative checksum,

[e)] a second segment checksum [(PSj)] which is formed for each said data segment [(Dj, j = a .. z)] of said [the] digital data to which said [the] first commutative checksum [(KP1)] is allocated,

5 [f) a second commutative checksum (KP2) is formed by] a commutative operation [( $\oplus$ )] which operates on said [the] second segment checksums [(PSj)] which forms a second commutative checksum, and

[g)] a comparator which checks for a match between said [the] second commutative checksum [(KP2) is checked for a match with the] and a  
10 reconstructed first [reconstructed] commutative checksum [(KP1)].

Cancel ~~claim 13~~ and substitute the following claims <sup>34 35 36</sup> ~~36, 37, and 38~~ therefor.

<sup>34</sup>

36. An arrangement according to claim 10, wherein:  
said first segment checksums are formed in accordance with a type  
15 selected from the group consisting of a hashing value, a CRC code, and a cryptographic one-way function.

<sup>35</sup>

37. An arrangement according to claim 11, wherein:  
said second segment checksums are both formed in accordance with a  
type selected from the group consisting of a hashing value, a CRC code, and a  
20 cryptographic one-way function.

<sup>36</sup>

~~38.~~ An arrangement according to claim 12, wherein:  
said first segment checksums and said second segment checksums are  
both formed in accordance with a type selected from the group consisting of a  
hashing value, a CRC code, and a cryptographic one-way function.

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Cancel claims 14 and 15, and substitute the following claims 39, 40,  
and 41 therefor.

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39. An arrangement according to claim 10 wherein:

said cryptographic operation is an operation selected from the group  
consisting of a symmetric cryptographic method and an asymmetric  
cryptographic method.

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40. An arrangement according to claim 11 wherein:

said cryptographic operation is an operation selected from the group  
consisting of a symmetric cryptographic method and an asymmetric  
cryptographic method.

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41. An arrangement according to claim 12 wherein:

said cryptographic operation is an operation selected from the group  
consisting of a symmetric cryptographic method and an asymmetric  
cryptographic method.

40 41 42  
Cancel claim 16 and substitute the following claims 42, 43, and 44  
therefor.

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42. An arrangement according to claim 10 wherein said  
commutative operation exhibits the property of associativity via the  
arrangement of said arithmetic and logic unit.

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43. An arrangement according to claim 11 wherein said  
commutative operation exhibits the property of associativity via the  
arrangement of said arithmetic and logic unit.

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An arrangement according to claim 12 wherein said commutative operation exhibits the property of associativity via the arrangement of said arithmetic and logic unit.

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therefor.

Cancel claim 17 and substitute the following claims 43, 44, and 45

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An arrangement according to claim 10 wherein:  
said digital data are protected, and  
said data segments have no ties to a specific ordering.

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An arrangement according to claim 11 wherein:  
said digital data are protected, and  
said data segments have no ties to a specific ordering.

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47.

An arrangement according to claim 12 wherein:  
said digital data are protected, and  
said data segments have no ties to a specific ordering.

15

[

therefor.

Cancel claim 18 and substitute the following claims 46, 47, and 48

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48.

An arrangement according to claim 10 wherein:  
said digital data are protected via an arrangement of said arithmetic and logic unit, and

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said digital data are processed in accordance with a network management protocol.